Tarrant and Johnson Counties, Texas | Case Studies

Texas leads the country in natural gas production.[i] Tarrant and Johnson counties contribute significantly to Texas's natural gas production due to their geographic positioning atop the rich reserves of the Barnett Shale field in the Bend Arch-Fort Worth Basin.

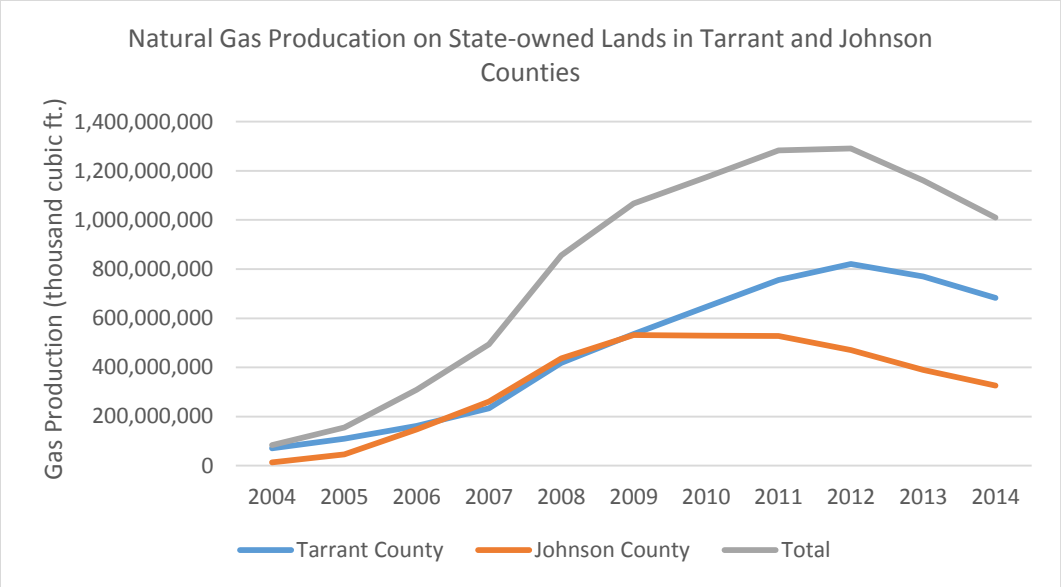
Geology and history

The Barnett Shale reserve spans approximately 5,000 square miles of sedimentary clay and quartz rock, with much of the productive portion of the rock located beneath Tarrant and Johnson counties. With an estimated 43 trillion cubic feet of proved reserves of natural gas, the Barnett Shale is one of the largest onshore natural gas formations in the country.[ii]

For many years, the Barnett Shale acted as an important sealing cap rock for conventional oil and gas development, but was not regarded as a legitimate source for economically viable drilling. However, technological advances in the 1980s allowed Mitchell Energy to drill its first well, and drilling activity increased with rising gas prices in the 1990s. Specifically, horizontal drilling and hydraulic fracturing techniques allowed producers to access more natural gas from relatively thin shale deposits. The number of horizontal wells in the Barnett Shale grew from approximately 400 in 2004 to 10,860 in 2011.[iii] [iv]

Production

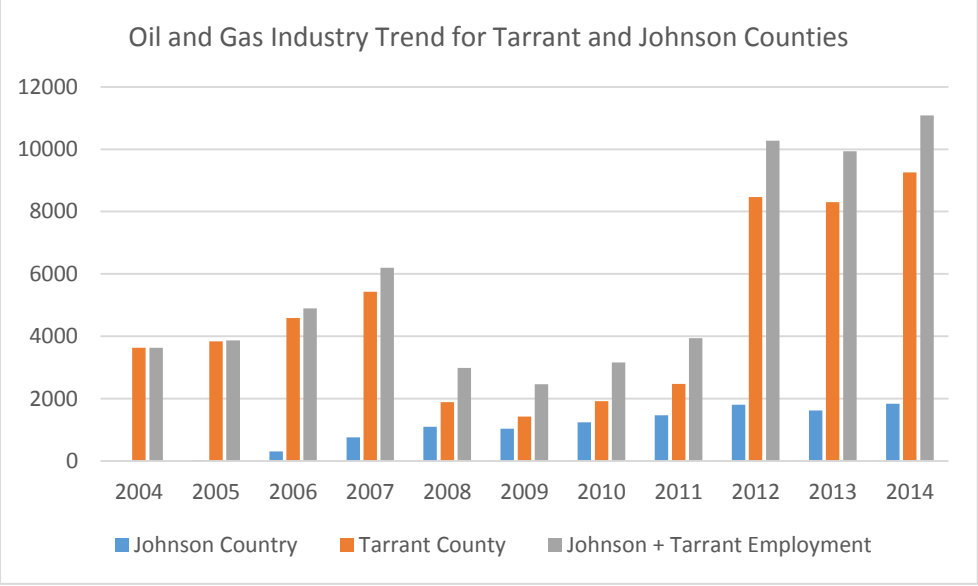
In 2014, Tarrant and Johnson counties produced a combined 1 trillion cubic feet of natural gas from state-owned lands, constituting a significant portion of Texas's total 8 trillion cubic feet output.[v] [vi] [vii] Almost all other drilling in the state occurs on private lands, as only 1.8% of the acreage in Texas is federal land.[viii] 2014 output was more than 6 times output of only ten years prior.[ix] [x] However, production began to drop in 2013 with falling natural gas prices and strong global supplies.



xi

Employment

The boom in natural gas production in the Barnett Shale over the past decade increased employment in this sector. Based on data from the U.S. Census Bureau, the number of residents employed in the oil and gas industries has more than quadrupled in the past decade.[xii] In 2014, the oil and gas industry (including extraction, drilling, and support services) employed 11,087 residents, up from 9,929 in 2013. This represents 1.5% of the two counties' total employment of 753,137 and less than 0.01% of the two counties' total population of 2.10 million.[xiii]



xiv

Revenue

The State of Texas levies a Natural Gas Production Tax at 7.5% of the market value of the gas, but with the various allowable exemptions and reductions, the effective tax rate hovers below 2%.[xv] In 2014, the state government collected $1.2 billion from this tax, down from $1.5 billion in 2013. In 2013, Texas earmarked 25% of these tax revenues for investment in the Permanent School Fund (PSF), and directed the rest to the state's Economic Stabilization Fund.[xvi] The interest earned on the PSF investments is distributed by the State Board of Education to every school district on a per-pupil basis.[xvii]

The state also collects royalties from the natural gas produced on state-owned land. The Texas General Land Office typically receives a royalty worth 20% to 25% of the value of the resources extracted from state land. This can be paid in the form of cash or actual oil and gas for resale to public entities. Oil and gas leases on state-owned lands generate more revenue than any other source of income for the public education endowment. In its history, the Texas General Land Office has deposited more than $16.8 billion into the PSF from oil and gas production revenue.[xviii]

Tarrant and Johnson counties derive additional revenue from extractive industries through local property and mineral taxes. In Tarrant County, thousands of homeowners own very small interests in gas units located under large residential developments.[xix] The value of all real property in a given county is assessed by the County Appraisal District, and property taxes are levied based on applicable mill rates for the locality. Property tax revenue for Tarrant and Johnson counties from all sources, not just natural gas property, totaled $380 million in 2014, $335 million from Tarrant County and $45 million from Johnson County.[xx] [xxi]This constituted a 4% increase from 2013. In its 2012 annual report, the Tarrant County Auditor's Office cited the development of Barnett Shale gas resources as a factor in providing significant employment and business opportunities, which helped to offset the reduction in other property values and provided additional taxable value.[xxii] [xxiii]

Costs

Texas leaves the siting and permitting for natural gas development to its municipalities, and while benefits accrue to these communities, extraction does come with costs. During well construction and drilling, heavy truck traffic causes wear on roads and bridges that can significantly reduce their service life. This problem is particularly pronounced on roadways that were not originally designed to support industrial traffic. According to the Texas Department of Transportation (DOT), the volume of truck traffic required to bring one gas well into production is equivalent to the impact of approximately eight million cars; truck traffic required to maintain that well is equivalent to another two million cars. Constructing such a well reduces highway service life by as much as 53%.[xxiv]

In its 2012 State Water Report, the Texas Water Development Board recommended $400 million in public expenditures on statewide water-management strategies related to the mining sector. These expenditures ranged from mining conservation outreach efforts to water-quality monitoring and related policy work. While fracturing and total mining water use continues to represent less than 1% of statewide water use in Texas, percentages can be significantly larger in some areas, and the use of water for hydraulic fracturing operations is expected to increase significantly through 2020.[xxv] Various cities in Texas have accepted tens of thousands of gallons of wastewater from extractive industries into their municipal water treatment plants. For example, as of June 2010, Fort Worth's wastewater system had treated 19,000 barrels of oil and gas wastewater.[xxvi]

The Texas Railroad Commission requires operators to remove water from extraction pits and refill them with sediment within set time frames, as well as completing the appropriate paperwork for any dry or inactive wells that will remain offline for more than a year.[xxvii] However, in cases where operators do not comply, Texas relies on its Oil and Gas Regulation Cleanup Fund to reclaim oil and gas wells.[xxviii] In FY 2014, the fund paid approximately $63 million for well plugging, site reclamation, monitoring and inspections, oil and gas permitting, and administration, up from $54 million in 2013. The Commission set aside an additional $17 million in encumbrances for these activities.[xxix] [xxx] A combination of industry permitting fees, production taxes, enforcement penalties, reimbursements, proceeds from the sale of salvaged equipment and hydrocarbons, and federal money from the Coastal Impact Assistance Program finance the fund.[xxxi]

Data availability

The table below highlights data sources used to compile this narrative, as well as any gaps in publicly available data.

Measure	Data availability	Data gaps
Production	The Texas Railroad Commission publishes annual natural gas production data at the county level for state-owned lands.	
Employment	The U.S. Census Bureau Censtats data on County Business Patterns provides annual employment data for specific industries at the county level. Employment in the oil and gas industries is defined as employment in the following North American Industry Classification System codes: 211, 21311, and 213112. For any employment estimates identified using the letter-coded ranges	Censtats employment data is collected in March of each year and does not take seasonal employment trends into account. In addition, data does not separate out employment related to natural gas extraction from the broader oil and gas sector.

Measure	Data availability	Data gaps
	(e.g., "a" = 0–19 employees), the average number was used (e.g., "a" = 9.5 employees).	
Revenue	The State of Texas Legislative Budget Board, Texas General Land Office (Permanent School Fund), and Tarrant and Johnson counties' financial reports provide annual revenue information.	Data on how sales and use taxes relate to extractive activities was not found. The latest available comprehensive annual financial report for Johnson County was from 2014. Tarrant County also used 2014 revenue data; FY 2015 data was available, but it was not used to facilitate accurate comparison across counties.
Costs	The Texas DOT, Texas Water Development Board, and Texas Railroad Commission publish publicly-available cost information reports.	Data on how public expenditures for emergency services relate to extractive activities was not found.

Notes

[i] U.S. Energy Information Administration, Natural Gas Gross Withdrawals and Production, 2015
[ii] U.S. Energy Information Administration, Review of Emerging Resources: U.S. Shale Gas and Shale Oil Plays, 2011
[iii] U.S. Energy Information Administration, Technology drives natural gas production growth from shale gas formations, 2011
[iv] U.S. Energy Information Administration, Barnett Shale Play, Fort Worth Basin, Texas (PDF), 2011
[v] Data excludes private and federal land
[vi] Railroad Commission of Texas, Natural Gas Production Data, 2005–2014
[vii] Railroad Commission of Texas, Natural Gas Production and Well Counts (since 1935)
[viii] Congressional Research Service, "Federal Land Ownership: Overview and Data," 2012, p. 5 (PDF)
[ix] Railroad Commission of Texas, Natural Gas Production Data, 2005–2014
[x] Railroad Commission of Texas, Natural Gas Production and Well Counts (since 1935)
[xi] Railroad Commission of Texas, Natural Gas Production Data, 2005–2014
[xii] U.S. Census Bureau, Censtats Datanases, mid-March employment data for NAICS codes 211, 21311, and 213112 in Johnson and Tarrant counties 2004–2013 using averages for letter-coded ranges (a – f
[xiii] Ibid.
[xiv] Ibid.
[xv] State of Texas Legislative Budget Board, Overview of Natural Gas Tax Structures (PDF)
[xvi] Texas Comptroller of Public Accounts, Texas Net Revenue\ by Source - Fiscal 1978-2013
[xvii] Texas General Land Office, Permanent School Fund Overview
[xviii] Texas General Land Office, Oil & Natural Gas
[xix] Tarrant County Texas, FAQ's – Property Tax and Mineral Tax
[xx] Tarrant County, Texas Comprehensive Financial Report, 2014

[xxi] Johnson County, Texas, Comprehensive Annual Financial Report, 2013
[xxii] Johnson County, Texas, Comprehensive Annual Financial Report, 2012
[xxiii] Tarrant County, Texas, Comprehensive Financial Report (PDF), 2013
[xxiv] Texas Department of Transportation, Impact of Energy Development Activities on the Texas Transportation Infrastructure (PDF), 2012
[xxv] Texas Water Development Board, Water For Texas 2012 State Water Plan (PDF)
[xxvi] Specific fiscal costs to municipalities not specified. Texas Railroad Commission, Water Use in Association with Oil and Gas Activities
[xxvii] Railroad Commission of Texas, Oil & Gas Filing Checklist from Prospect to Production
[xxviii] Railroad Commission of Texas, Oil and Gas Division
[xxix] Texas's fiscal year spans from September 1 of the previous year through August 31 of the current year
[xxx] Railroad Commission of Texas, Oil and Gas Regulation and Cleanup Program, Annual Report – Fiscal Year 2013 (PDF)
[xxxi] Specific fiscal costs to municipalities not specified. Ibid.